Industrial Minimum Monitoring Schedule

Q (mgd)	Major Constituents	Minor Constituents
< .005	Once/3 months	Once/6 or 12 months
.005 - .05	Once/month	Once/6 months
.05 - 1.0	Once/month	Once/3 months
1.0 - 10	Once/week	Once/month
10 - 50	Three/week	Once/month
> 50	Once daily	Once/week

5 Dec 73

Municipal Monitoring Schedules

Q (mgd)	Frequency of Analysis (major characteristics)	Flow Rate Monitoring*	Definition of Composite Sample
PONDS	"Interim Monitoring"**		
<1	Once monthly	4 readings at equal time intervals for at least one hour	4 samples at equal time intervals for at least one hour
1-5	Once weekly	8 readings at equal time intervals between 8 am and 4 pm	8 samples at equal time intervals between 8 am and 4 pm
>5	Once daily	8 readings at equal time intervals for 24 hours	8 samples at equal time intervals for 24 hours
	"Final Monitoring"***		
<1	Once monthly	4 readings at equal time intervals for at least one hour	4 samples at equal time intervals for at least one hour
1-5	Once weekly	Continuous, daily	8 samples at equal time intervals between 8 am and 4 pm
>5	Once daily	Continuous, daily	8 samples at equal time intervals for 24 hours
NON-PONDS	"Interim Monitoring"		
<1	Once monthly	8 readings at equal time intervals between 8 am and 4 pm	8 samples at equal time intervals between 8 am and 4 pm
1-5	Once weekly	8 readings at equal time intervals for 24 hours	8 samples at equal time intervals for 24 hours
>5	Once daily	8 readings at equal time intervals for 24 hours	8 samples at equal time intervals for 24 hours

Q (mgd)	Frequency of Analysis (major characteristics)	Flow Rate Monitoring*	Definition of Composite Sampl
	"Final Monitoring"		
<1	Once monthly	8 readings at equal time intervals between 8 am and 4 pm	8 samples at equ time intervals b tween 8 am and 4
1-5	Once weekly	Continuous, daily	8 samples at equ time intervals f 24 hours
>5	Once daily	Continuous, daily	8 samples at equ time intervals f 24 hours

* Non-continuous flow rate monitoring prescribed only if continuous recording is not available as of effective date of permit.

** Use interim monitoring schedule only if final monitoring schedule is not in effect as of effective date of permit and must be implemented on compliance schedule; commence interim monitoring schedule not later than 90 days from effective date; major characteristics are suspended solids and settleable solids.

*** Commence not later than 90 days from effective date of permit unless interim monitoring schedule is used, then commence 12 to 18 months from effective date of permit; major characteristics are 5-day biochemical oxygen demand, suspended solids, fecal coliform bacteria, pH, settleable solids, and total residual chlorine.

Monitoring Policy for Small Municipal [illegible]
Retention Times ($Q \leq 1.0$ mgd, $t \geq 20$ days):

a. Monitoring Schedule - Interim

Discharge Serial Number	Constituent	Minimum Frequency of Analysis	Sample Type
001	Flow	Once/month	Average of four readings per day
001	Settleable Solids	Once/month	Discrete
001	Suspended Solids	Once/month	Composite

b. The permittee shall (1) implement the monitoring schedule above within ninety (90) days from the effective date of this permit and (2) submit quarterly reports, properly filled in and signed to the Regional Administrator and State Agency. Monitoring, analytical, and reporting requirements may be modified by the Regional Administrator upon due notice.

c. Monitoring Schedule - Final

Discharge Serial Number	Constituent	Minimum Frequency of Analysis	Sample Type
001	Flow	Once/month	Average of four readings per day
001	pH	Once/month	Discrete
001	Settleable Solids	Once/month	Discrete
001	Fecal Coliform Bacteria	Once/month	Discrete
001	Suspended Solids*	Once/month	Composite
001	Biochemical Oxygen Demand (5-day)*	Once/month	Composite
001	Total Residual Chlorine**	Once/month	Discrete

* Both the influent and effluent shall be sampled.

** Sampling shall begin upon initiation of chlorination of final effluent.

d. The permittee shall (1) implement the monitoring schedule above by and (2) submit quarterly reports properly filled in and signed to the Regional Administrator and State Agency. Monitoring, analytical, and reporting requirements may be modified by the Regional Administrator upon due notice.

ENVIRONMENTAL PROTECTION AGENCY, REGION IX

Assistant Administrator for Enforcement
and General Counsel (EG-329)

Director, Enforcement Division
EPA, Region IX

JUN 14 1974

Comments on "Proposed Procedural Guidance for the Issuance and Monitoring of Permits for the Discharge of Irrigation Return Flow"

We differ with the "Proposed Procedural Guidance for the Issuance and Monitoring of Permits for the Discharge of Irrigation Return Flows" which was transmitted to you by DFIC on May 16, 1974 in the following respects:

1. A uniform short term permit is needed to (1) establish the applicability of the program to irrigated agriculture, (2) collect waste load data through a self-monitoring and reporting requirement, (3) require the permittee to develop a plan for control of the most relevant waste load which varies from region to region, and (4) give EPA time to assess the technology.

   The length of the permit period should enable the discharger to collect sufficient data as to be representative of the discharge and develop a plan to reduce the load from the pollutants in his return flows. A two year permit (rather than three years) is sufficient for collection of effluent data and development of a control plan by the discharger. In the two year period between issuance of these "first generation" permits and the expiration date of the permits, the on-going research being conducted at the Robert S. Kerr Environmental Research Laboratory at Ada, Oklahoma investigating the legal, technical, and institutional aspects related to the definition of Best Practical Control Technology Currently Available will be completed. That research is being conducted by the Office of Research and Development of the Environmental Protection Agency.

   The "second generation" of permits would then be issued in consideration of the technology determined by ORD and local conditions. The expiration date of July 1, 1977 suggested in the "Proposed Guidance" would not allow utilization of the monitoring data obtained from the "first generation" of permits and the results from the research being conducted by ORD for "second generation" permits.

2. The requirement of elimination of tailwater discharges as suggested in the "Proposed Guidance" was not included in the consensus of those present at the workshop. There is presently no sound basis for effluent guidelines which would specify elimination of tailwater discharges on a national basis.

3. Submittal of plans for control or reduction of pollutant loads in the effluent should occur before the 180 day period prior to expiration of the permit and coincidental with the reapplication deadline instead of July 1, 1977 as suggested in the "Proposed Guidance." The plan would be developed as a final stage in the permit and would be subject to review, amendment and approval of the permitting authority. Re-issuance of the permit would follow and would include, as a condition, a requirement for compliance with the plan for control of the pollutants entering the waters of the United States. Completion of this report in a timely manner is important to the re-issuance of the irrigation permits. The re-issued permits would require compliance with effluent limitations by July 1, 1977 or a date prescribed in effluent guidelines.

Original signed by
R. L. O'Connell

Richard L. O'Connell

cc: Director, SWIC, Denver

Reading file
Enf. Div.
Permits Branch
WPierce/jc 6/14/74
File 850.3
11 & 12

PROCEDURAL GUIDANCE
FOR
THE PREPARATION, ISSUANCE, AND MONITORING
OF PERMITS FOR THE DISCHARGE OF IRRIGATION RETURN FLOW

INTRODUCTION

Section 301(b) of the FWPCA Amendments of 1972 requires the achievement by no later than July 1, 1977, of effluent limitations for point sources, other than publicly owned treatment works, which require the application of the "best practicable control technology currently available" as defined by the Administrator pursuant to Section 304(b) of the Act. Section 301(b) also requires the achievement by no later than July 1, 1983, of effluent limitations for point sources, other than publicly owned treatment works, which require the application of "best available technology economically achievable" which will result in reasonable future progress toward the National goal of eliminating the discharge of all pollutants.

Section 304(b) mandates the Administrator to publish regulations providing guidelines for effluent limitations setting forth the degree of effluent reduction attainable through the application of the "best practicable control technology currently available" and the degree of effluent reduction attainable through the application of the "best available technology economically achievable" including treatment techniques, process and procedure innovations, operating methods, and other alternatives.

Section 306 of the Act requires the achievement by new sources of a Federal standard of performance providing for the control of the discharge of pollutants which reflects the greatest degree of effluent reduction which the Administrator determines to be achievable through application of the best available demonstrated control technology, processes, operating methods or other alternatives including where practicable, a standard per-

mitting no discharge of pollutants.

Section 306(b)(1)(B) of the Act requires the Administrator to propose regulations establishing Federal standards of performance for categories of new sources included in a list published pursuant to Section 306(b)(1)(A). The Administrator published in the Federal Register on January 16, 1973 (38 FR 1624) a list of 27 source categories which the law required as a "minimum".

Section 307(c) of the Act requires the Administrator to promulgate pretreatment standards for new sources at the same time that standards of performance for new sources are promulgated pursuant to Section 306.

These requirements have been determined to be applicable to irrigation return flows in those cases where such flows constitute the discharge of pollutants from a point source into navigable water. Although certain irrigation activities are excluded from the NPDES requirements per the July 5, 1973 Regulations (40CFR Parts 124 and 125), the excluded categories remain subject to all other applicable provisions of Federal law and the Act, including, in particular, effluent limitations guidelines which may be promulgated for the point source category.

It is the consensus of knowledgeable opinion, within the Environmental Protection Agency, that "best practicable control technology currently available" and "best available technology economically achievable" have not been defined and are not presently definable for irrigation activity point sources. The Agency clearly recognizes its responsibility under PL 92-500, and under its Charter, to pursue the orderly implementation of the pollution control measures necessary to protect the quality of receiving waters for their established uses. The responsibility to avoid imposition of undue economic stress, upon dischargers, is also clear.

In the absence of broadly applicable, and economically feasible treatment technology, the Agency has set a course described herein, which identifies sources, requires compliance with the Act, initiates the acquisition of a data base, provides for implementation of controls, where clearly required and presently feasible, and focuses research efforts on defined end points, thereby enabling timely implementation of the intent of the Congress. The guidance provided herein is deemed appropriate in the light of existing technology gaps. It is the intent of the Administrator to promulgate formal guidelines for irrigation return flow point sources on or about December 31, 1976. These guidelines will reflect additional knowledge gained as a result of the monitoring activities to be conducted during the interim.

Water Quality Effects of Irrigation Return Flows

Irrigation return flows cause a wide variety of detriments to the quality of receiving waters. These detriments include, but are not necessarily limited to, increases in solids (suspended, settleable, and dissolved), nutrients, pesticides, and increased temperature. In areas wherein consumptive losses of water are attributable to high rates of evapotranspiration and evaporation, increases in total dissolved solids (salinity) may be acute. In the arid southwest, increases in salinity of streams is caused by salt-loading and salt concentrating factors. These include consumptive use, leaching of irrigated soils, overland runoff, natural sources such as mineral springs, and industrial sources. Detriments attributable to excessive salinity in water include sodium hazard to heart patients; excessive softening costs to domestic users;

growth retarding and plant killing effects in irrigation use; and boiler scale in industrial applications.

Nutrients reach receiving waters via runoff of excess applied irrigation water (tail water) and through deep percolation and subsequent return as base flow or diffuse discharges. In the northwestern States, natural phosphate sources are, in many areas, sufficient to stimulate nuisance aquatic growth when combined with nitrogenous forms discharged by irrigation drains. The detriments associated with over-enrichment of streams include accelerated eutrophication of lakes and reservoirs, impairment of fisheries, depressed oxygen concentrations, impairment of navigation, taste and odor in drinking water supplies, and interference with water treatment processes.

Pesticides enter receiving waters as a result of drift and overspray from aerial applications on and into canals, drains, and streams; runoff from fields during storms; sub-surface drainage and tailwater from irrigated fields; dumping of excess mixes and cleanup of application equipment in waterways; and direct application to control aquatic weeds, rough fish, and aquatic insect pests.

Organo-chlorine pesticides are highly persistent in the environment, are toxic to fish and warm-blooded animals, and tend to concentrate through the aquatic food chain. When ingested in sub-lethal quantities, these compounds are stored in the fat and organs of animals, including humans. Thus stored, they become available in higher concentrations when fat is used during stress or lowered food intake. The organo-chlorines have been associated with many diverse damages to the aquatic environment, and have become ubiquitous in streams and oceans.

Organo-phosphorus compounds are much more toxic and much less per-

sistent in the environment than are the organo-chlorines. Certain of those compounds are so highly toxic that skin contact, inhalation or ingestion of relatively minor amounts can bring on nervous collapse within seconds and death within minutes. Minute amounts of these materials in streams can produce massive fish kills.

The carbamates are also highly toxic, but since they are short-lived, they are generally considered a lesser hazard than the chlorinated and phosphorus compounds. Herbicides are formulated to kill or retard growth of plants. They are, however, toxic to animals exposed to high concentrations.

Temperature changes, in receiving waters, attributable to irrigation return flow are not well defined. Unquestionably, some increases occur when excess applied irrigation water is exposed to elevated ambient temperatures and is discharged as tailwater. Temperature of sub-surface return flow is normally not elevated sufficiently to cause serious problems in receiving waters. Detriments associated with thermal discharges include depressed oxygen concentrations, fish kills, alterations in aquatic regimes, interference with treatment processes and cooling water use.

Suspended and settleable solids in irrigation return flows are attributable to presence of the solids in the applied water and in control spills from supply canals and laterals; pickup and erosion in fields and subsequent discharge of tail water; erosion and sloughing in canals and drains; and erosion associated with storm runoff. Aside from the obvious, detriments of soil loss, additions of suspended and settleable solids to receiving waters cause blanketing of stream and reservoir bottoms, thereby impairing bottom life, navigation, hydraulic properties, storage capacity

and recreational potential of such water bodies. The costs of treating water for most uses is directly proportional to the quantities of suspended and settleable solids present.

Control of Pollutants

The need to control pollution, of receiving waters, by irrigation return flow sources is obvious; however, formidable obstacles stand in the path of control through the NPDES permit program. Although the problem is many-faceted, the most difficult aspect is that much of the pollutant discharge is caused by excessive application of irrigation water. Excessive applications are made by irrigators to preserve prior appropriated water rights. Thus, the 1972 Amendments to the FWPCA are in direct conflict with established western water law. Stated another way, if the requirement for efficient use* of irrigation water could be imposed, the discharge of pollutant loads could be greatly reduced, for example:

- lesser quantities of salts would be leached from irrigated soils,
- greater amounts of water could remain in receiving streams to dilute incoming pollutants loads,
- solids (dissolved, suspended, and settleable), pesticides, and fertilizers carried to streams by tailwater discharges could be retained on fields,
- erosion and sloughing of drainage channels could be minimized through reduction of volumes of control spillage, percolated return flow, and tailwater discharges,

* The term "efficient use", as applied here, includes "on-farm water use efficiency" and "conveyance efficiency".

- losses from unlined conveyance channels, and leaching of soils by water lost could be reduced,
- evaporation effects (concentration of salts, abstraction of dilution water) could be minimized, and
- cost of treatment of remaining discharges could be reduced.

The irrigator is not easily persuaded to implement such controls when to do so may lead to eventual loss of his water rights. It goes without saying, that an attempt to force such measures through the permit program would undoubtedly be challenged in the western courts.

Other obstacles to successful control through the permit program, include gaps in the necessary treatment technology and economic impact of treatment. At present, a few irrigators in the northwestern United States have constructed settling ponds to remove settleable solids. This approach has an added benefit in that some organics, including pesticides and fertilizer components are adsorbed on the solids and are dropped out in the ponds. It may be the case that these organics are again made available in the pond discharges, as a result of anaerobic conditions in bottom muds. The ponding approach is not proven, and transferability to other areas is suspect.

Application of conventional advanced waste treatment technology, for nutrient removal, and desalination using present technology are economically prohibitive for irrigation sources.

Research in irrigation source control technology and in implications of western water law is presently in progress at the Robert S. Kerr Environmental Research Laboratory, Ada, Oklahoma. This research is expected to indicate approaches to both the legal quandry and technology

gaps that now negate the permit program as a viable tool for control of pollution by irrigation return flow in the western United States.

Procedural Guidance

The Environmental Protection Agency, recognizing the present difficulties in control of pollution by irrigation return flow, enunciates the following policy with regard to NPDES permits for irrigation return flows:

1. The Agency will rigorously enforce the provisions of 40CFR 124-124, dated July 5, 1973, which require application for NPDES permits by irrigators of 3,000 or more contiguous acres. Permits may also be required where an excluded agricultural point source is a significant contributor of pollution.
2. "Best practicable control technology currently available" and "best available technology economically achievable" for irrigation return flow have not been defined and are presently not definable in the context of PL 92-500, Section 304(b)(1) since treatment is neither "practicable" nor "economically achievable".
3. Initial permits issued to irrigator applicants will, in general, be directed toward the acquisition of basic data (kinds and forms of pollutants discharged in specific geographical areas) through self-monitoring and through verification by EPA and State Water Pollution Control Agencies, as appropriate. The designation of specific parameters to be monitored shall be at the discretion of the Regional Administrator, but at minimum shall include:
    a. Quantity of water applied to the irrigated lands and discharged therefrom.

b. Total dissolved solids (gravimetric) measurement of specific conductance may be substituted once the TDS/EC relationship for a particular source has been established to the satisfaction of the Regional Administrator.

c. Suspended solids (gravimetric) turbidimetric method may be substituted once the correlation for a particular source has been established to the satisfaction of the Regional Administrator.

d. Other parameters related to specific water quality problems in the receiving waters.

Each discharger is to be required to submit, by no later than July 1, 1977, a plan for control of effluent quality, including plans for the elimination of tailwater discharges. The minimum specified frequency for monitoring should be bi-weekly. Grab samples, except as otherwise indicated by local conditions, are considered adequate.

4. Initial permits will be issued for the period ending July 1, 1977.

5. The related research, now in progress, or planned at, and under the direction of, the Robert S. Kerr Environmental Research Laboratory at Ada, Oklahoma, is directed toward definition of the state-of-the-art in various legal, technical, and institutional aspects related to the control of pollution by irrigation sources. This work is to be culminated during the late 1975 to early 1976 period, and should provide the basis for definition of BPCTCA. These findings will, in turn, provide the basis for promulgation of Guidelines in 1977, and subsequent issue of "second generation permits" requiring application of BPCTCA.

6. Continuing studies, beyond those cited above, at the Ada research facility will be directed toward the development of Best Available Control Technology Economically Achievable for the control of pollution by irrigation return flows. Such studies are to be completed by no later than 1 July 1980.

NATIONAL POLLUT[illegible]HARGE ELIMINATION SYSTEM

DISCHARGE MONITORING REPORT

Form Approved
OMB NO. 158-R0073

(2-3) ST | (4-16) PERMIT NUMBER | (17-19) DIS | SIC | LATITUDE | LONGITUDE

REPORTING PERIOD: FROM (20-21) YEAR (22-23) MO (24-25) DAY TO (26-27) YEAR (28-29) MO (30-31) DAY

INSTRUCTIONS

1. Provide dates for period covered by this report in spaces marked "REPORTING PERIOD".
2. Enter reported minimum, average and maximum values under "QUANTITY" and "CONCENTRATION" in the units specified for each parameter as appropriate. Do not enter values in boxes containing asterisks. "AVERAGE" is average computed over actual time discharge is operating. "MAXIMUM" and "MINIMUM" are extreme values observed during the reporting period.
3. Specify the number of analyzed samples that exceed the maximum *(and/or minimum as appropriate)* permit conditions in the columns labeled "No. Ex." If none, enter "0".
4. Specify frequency of analysis for each parameter as No. analyses/No. days. *(e.g., "3/7" is equivalent to 3 analyses performed every 7 days.)* If continuous enter "CONT."
5. Specify sample type *("grab" or "__ hr. composite")* as applicable. If frequency was continuous, enter "NA".
6. Appropriate signature is required on bottom of this form.
7. Remove carbon and retain copy for your records.
8. Fold along dotted lines, staple and mail Original to office specified in permit.

(32-37) PARAMETER		(3 card only) QUANTITY (38-45) MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	(62-63) UNITS	NO. EX	(4 card only) CONCENTRATION (38-45) MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	(62-63) UNITS	NO. EX	(64-68) FREQUENCY OF ANALYSIS	(69-70) SAMPLE TYPE
FLOW	REPORTED				MGD		******	******	******				
	PERMIT CONDITION	******					******	******	******				
PH	REPORTED		******		STANDARD UNITS		******	******	******				
	PERMIT CONDITION		******				******	******	******				
BOD 5	REPORTED				KG/DAY					MG/L			
	PERMIT CONDITION	******					******						
PERCENT REMOVAL BOD 5	REPORTED				%		******	******	******			******	******
	PERMIT CONDITION			******			******	******	******			******	******
SUSPENDED SOLIDS	REPORTED				KG/DAY					MG/L			
	PERMIT CONDITION	******					******						
PERCENT REMOVAL SUSPENDED SOLIDS	REPORTED				%		******	******	******			******	******
	PERMIT CONDITION			******			******	******	******			******	******
FECAL COLIFORM	REPORTED	******	******	******						N/100ML			
	PERMIT CONDITION	******	******	******			******						GRAB
	REPORTED												
	PERMIT CONDITION												

NAME OF PRINCIPAL EXECUTIVE OFFICER	TITLE OF THE OFFICER	DATE	
LAST FIRST MI	TITLE	YEAR MO DAY	*I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete, and accurate.* SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

T-40 (4-74)

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